Listing of Claims

1 - 6 (canceled)

7. (Currently amended) A substrate grinding device, comprising:

an annular ring;

an annular first layer disposed over a surface of the annular ring, the first layer configured to alternate between a compliant state and a rigid state; and

an annular second layer disposed over the first layer, the second layer including an abrasive component configured to grind a surface of a substrate.

8. (Original) The substrate grinding device of claim 7, further comprising:

a shaft connected to the annular ring, the shaft having an axis coincident with an axis of the annular ring.

9. (Original) The substrate grinding device of claim 7, further comprising:

an electromagnetic field generator configured to generate an electromagnetic field proximate to at least a portion of the first layer.

10.(Original) The substrate grinding device of claim 7, wherein the first layer includes a membrane surrounding a fluid.

11. (Original) The substrate grinding device of claim 7, wherein the second layer includes diamonds disposed within a matrix, a portion of the diamonds protruding out of a bottom surface of the matrix.

12. (Original) The substrate grinding device of claim 10, wherein the fluid is one of a magnetorheological fluid and a magnetorheological polymer.

13. (Original) The substrate grinding device of claim 7, wherein the abrasive component is segmented.

14. (Currently Amended) A pre-planarization module configured to perform a long range planarization operation, comprising:
a semiconductor substrate support configured to rotate about a first axis; and an annular ring having a first side of an annular compliant layer affixed thereto, a second side of the compliant layer affixed to a planarizing surface, the annular ring configured to move perpendicular and parallel to a plane associated with the substrate support, the annular ring further configured 'to rotate about a second axis, the second axis being offset from the first axis, wherein the substrate support and the annular ring rotate in a same direction
wherein the compliant layer is a bladder filled with a fluid, the fluid configured to alternate

between a compliant state and a less compliant state.

15.(Canceled)

16. (Currently) The pre-planarization module of claim 14, wherein the fluid is a magnetorheological fluid.

17. (Original) The pre-planarization module of claim 14, wherein the compliant layer is one of polyurethane and rubber.

18. (Original) The pre-planarization module of claim 14, wherein the abrasive surface includes a plurality of abrasive segments.

19. (Original) The pre-planarization module of claim 16, further comprising:
an electromagnetic field generator configured to generate an electromagnetic field proximate to at least a portion of the compliant layer, the electromagnetic field causing the fluid to change from the compliant state to the less compliant state.

20. (Original) The pre-planarization module of claim 14, wherein the semiconductor substrate support includes a fluid capable of changing between a compliant state and a less compliant state in response to an electromagnetic field being generated proximate to the fluid.

21. (Original) The pre-planarization module of claim 14, wherein the compliant layer is a bladder filled with a polymer, the polymer configured to alternate between a compliant state and a less compliant state.

22. (Original) The pre-planarization module of claim 21, wherein the polymer is a magnetorheological polymer.

23. (Original) The pre-planarization module of claim 22, further comprising:
an electromagnetic field generator configured to generate an electromagnetic field proximate to at least a portion of the compliant layer, the electromagnetic field causing the polymer to change from the compliant state to the less compliant state.

24. (Original) The pre-planarization module of claim 14, wherein the semiconductor substrate support includes a polymer capable of changing between a compliant state and a less compliant state in response to an electromagnetic field being generated proximate to the polymer.